

## CLAIMS

1. Apparatus for deploying a device from a moving object utilizing a towing cable, comprising:

a housing adapted to be mounted on the moving object for storing the device to

5 be deployed therefrom;

a cable bailer mechanism mounted within the housing for paying out the cable, said bailer mechanism including a spool containing the cable, an outer rotatable bailer tube, a helix shaft rotatably mounted within the bailer tube and coupled to the spool for imparting reciprocating movement to said spool in response to the cable being unwound

10 from the spool as the bailer tube rotates when the device is deployed from the housing;

a control shaft independently rotatably mounted within the helix shaft and operationally coupled thereto; and

a brake mechanism including a DC motor operatively engageable with the control shaft for retarding rotation of said control shaft and the deployment of the towing

15 cable and the deployed object.

2. The apparatus defined in claim 1 wherein the control shaft is directly coupled to the DC motor free of intervening gears.

20 3. The apparatus defined in claim 2 including a plurality of cable guide rollers mounted on the bailer tube for directing the cable from the spool to the towed device.

4. The apparatus defined in claim 1 wherein a gear assembly operatively connects the control shaft to the helix shaft.
5. The apparatus defined in claim 3 wherein a stationary tube is telescopically mounted  
5 about the control shaft and helix shaft and is connected to the spool to prevent rotation of said spool.
6. The apparatus defined in claim 1 including an extendable boom mounted in a forward compartment of the housing for supporting the device within the housing, and a  
10 pressure device for forcing the boom and supported device through an open end of the housing when deploying the device.
7. The apparatus defined in claim 6 including at least one closure door mounted on the housing adjacent the open end thereof to close said open end when the device is stored  
15 therein.
8. The apparatus defined in claim 7 including spring means biasing for the closure door toward a closed position over the open end of the housing.
- 20 9. The apparatus defined in claim 6 including a pair of closure doors, each of said doors having a closure spring biasing the door toward a closed position.

10. The apparatus defined in claim 6 wherein the device being deployed includes a plurality of stabilizing fins; and in which springs bias the fins toward an expanded position.

5 11. The apparatus defined in claim 10 wherein the stabilizing fins engage ejection blocks located adjacent the open end of the housing to assist in deploying the device from said housing.

12. The apparatus defined in claim 1 including a cutter mechanism for severing the  
10 cable comprising:

an electric operated solenoid;

a spring biased gripper blade adapted to be brought into gripping engagement with the cable upon actuation of said solenoid; and

a cutter blade mounted on the solenoid adapted to be brought into cutting  
15 engagement with the cable upon actuation of the solenoid to sever said cable.

13. The apparatus defined in claim 12 wherein the gripper blade has a saw tooth edge to grip the cable.

20 14. The apparatus defined in claim 1 including a locking mechanism operatively engageable with the cable bailer mechanism to prevent further rotation of said bailer tube after the towing cable has reached a desired extended distance.

15. A method of retrieving a device towed from a moving vehicle by a towing cable which extends about a spool which oscillates along a helix shaft concentrically mounted about an inner control shaft operatively connected thereto, and wherein the cable is removed from the spool by an outer rotating member to permit rapid deployment of the device,

5 comprising the steps of:

reversing the rotation of the control shaft and correspondingly the direction of rotation of the helix shaft and outer rotating member by energizing a DC motor coupled to the control shaft to reel the cable back upon the spool.

10 16. The method defined in claim 15 including the step of actuating a solenoid to unlock a cam locking mechanism to permit the outer rotating member to reverse direction.

17. The method defined in claim 15 including the step of retracting an extended boom into an outer housing by engagement of the boom by the retrieved device.

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18. The method defined in claim 17 including the step of closing an open end of the housing by automatically moving a spring biased protective door to a closed position upon retraction of the boom into the housing.

20 19. The method defined in claim 17 including the step of automatically retracting a plurality of spring biased stabilizing fins mounted on the device by said fins engaging the housing upon the boom being retracted into the housing.

20. A cutter mechanism for severing a towing cable extending between a towing vehicle and a towed object, said cutter mechanism comprising:

an electric operated solenoid;

a spring biased gripper blade adapted to be brought into gripping engagement

5 with the cable upon actuation of said solenoid; and

a cutter blade mounted on the solenoid adapted to be brought into cutting engagement with the cable upon actuation of the solenoid while the cable is being gripped by the gripper blade to sever said cable.

10 21. The cutter mechanism defined in claim 20 wherein the gripper blade has a saw tooth edge to grip the cable.

22. The cutter mechanism defined in claim 20 wherein the gripper blade is mounted on a first plate and extends outwardly therefrom; and in which said plate is rotatably  
15 mounted on the solenoid and biased toward gripping engagement with the cable by a torsional spring.

23. The cutter mechanism defined in claim 22 wherein the cutter blade is mounted on a second plate and extends outwardly therefrom; and in which said plate is rotatably  
20 mounted on the solenoid between said first plate and the solenoid.

24. The cutter mechanism defined in claim 22 wherein the first plate is disc-shaped and is formed with a plurality of arcuate slots; and in which stop pins extend through said

slots to limit the rotational movement of said first plate when the gripper blade is brought into gripping engagement with the cable.

25. A locking mechanism engageable with a rotatable cable bailer tube which controls  
5 the deployment and retrieval of a device from a moving object utilizing a towing cable, said locking mechanism comprising:
- an electric operated solenoid;
  - a control ring mounted on the rotatable bailer tube; and
  - a plurality of cams moveable into and out of engagement with the control ring  
10 upon actuation of the solenoid to selectively lock and unlock the cable bailer tube.

26. The locking mechanism defined in claim 25 wherein the solenoid includes a shaft having a central opening providing a path for the towing cable.

- 15 27. The locking mechanism defined in claim 26 wherein the solenoid shaft includes gear teeth which operatively engage gear teeth formed on the cams for pivotally moving said cams into and out of engagement with the control ring.

28. The locking mechanism defined in claim 27 wherein each of the cams is an  
20 elongated member having the gear teeth formed on an inner end thereof and having a locking tooth formed on an extended end thereof; and in which a pin extends through an opening formed adjacent the extended end of each cam to pivotally mount said cam adjacent said control ring.

29. The locking mechanism defined in claim 25 wherein the cams are in locking engagement with the control ring when the solenoid is de-energized.

5 30. A method of severing a towing cable extending between a towing vehicle and a towed object, including the steps of:

providing a cutter mechanism having a gripper blade and a cutting blade and a source of power for moving said blades into contact with the towing cable;

10 moving the gripper blade into gripping contact with the cable outboard of the power source to maintain tension on said cable; and then

moving the cutting blade into engagement with the cable to sever the cable while the gripper blade maintains gripping engagement with said cable.

15 31. The method defined in claim 30 including the steps of passing the towing cable through a guide block; and moving the gripper blade and cutter blade through slots formed in the guide block for gripping and then severing the cable, respectively.

20 32. In a method for controlling the deployment of a towline connecting a mooring craft to an ejected object comprising the steps of monitoring velocity to determine when a point for optimum braking has been achieved and the engaging a brake system to retard deployment of the towline, wherein the improvement comprises the step using a DC motor to augment and control the brake system.